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CLERK

No.

IN THE
Supreme Court of the United States
OCTOBER TERM, 1984

NATIONAL BUSINESS SYSTEMS, INC., *et al.*,
Petitioners,

v.

AM INTERNATIONAL, INC., *et al.*,
Respondents.

APPENDIX II TO PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE SEVENTH CIRCUIT

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2417

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Sept. 13, 1966 D. W. JOHNSON 3,272,120

ADDRESS PRINTING MACHINES WITH ROLLER PLATENS

Filed Oct. 22, 1964 3 Sheets-Sheet 1

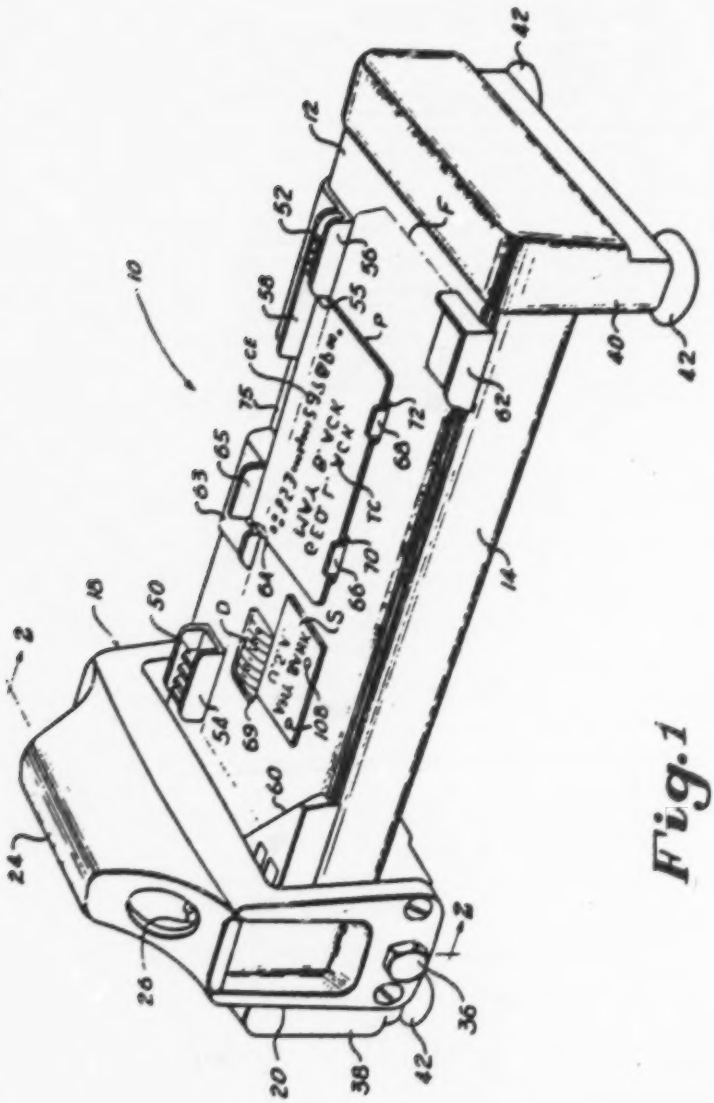

Fig. 1

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Sept. 13, 1966 D. W. JOHNSON 3,272,120

ADDRESS PRINTING MACHINES WITH ROLLER [illegible]

Filed Oct. 22, 1964 [illegible] Sheets-Sheet 2

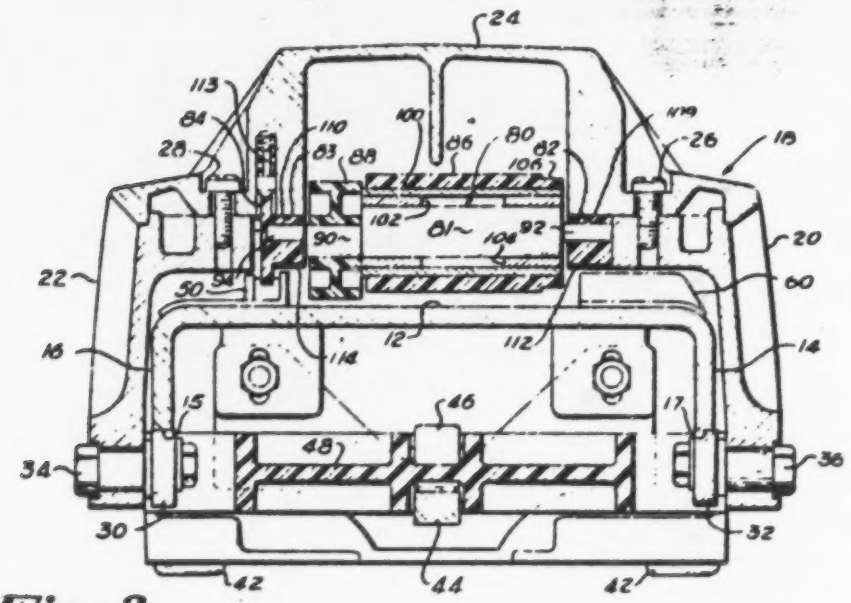

Fig. 2

Fig. 4

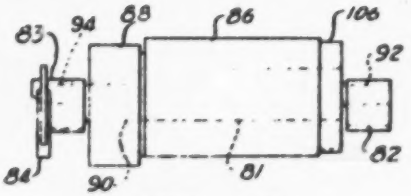

Fig. 3

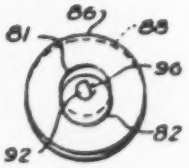

Fig. 5

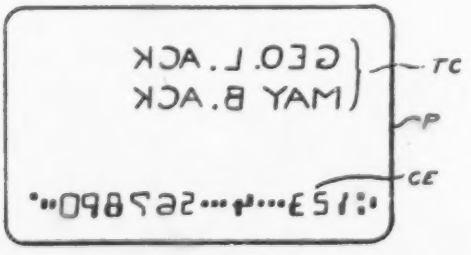

Fig. 6

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Sept. 13, 1966 D. W. JOHNSON 3,272,120

ANDROSS THINNING [illegible]

Filed Oct. 22, 1964 [illegible] Sheet 3

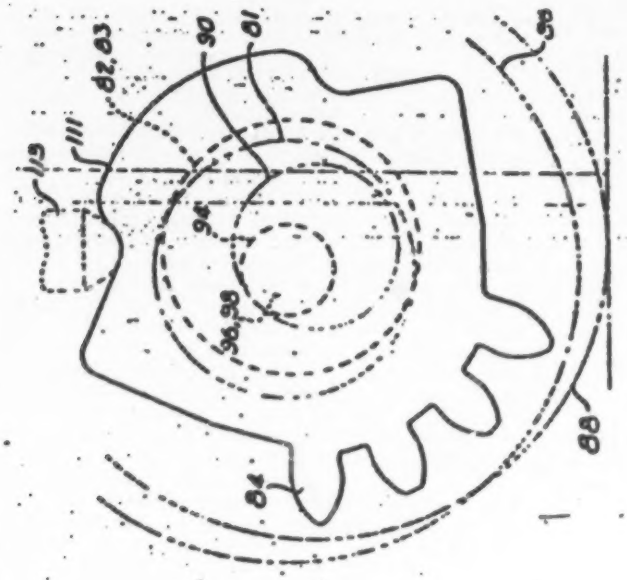

Fig. 7

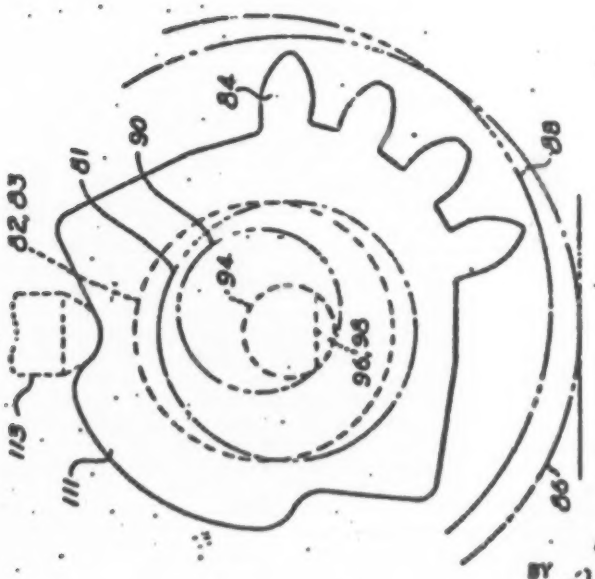

Fig. 8

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United States Patent Office 3,272,120 Patented Sept. 13, 1966

3,272,120

ADDRESS PRINTING MACHINES WITH ROLLER PLATENS

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Filed Oct. 22, 1964, Ser. No. 405,673
7 Claims. (Cl. 101—56)

The present invention relates to a printing machine and more particularly to a data recorder for imprinting forms from embossed printing plates.

Data recorders are currently being used in a wide variety of applications for imprinting various types of forms, documents and the like. While these data recorders are basically the same in that they imprint from embossed plates or cards, they differ in construction as dictated by the specific application for which they are used. For example, in credit transactions such as are commonly used in department stores, the data recorder is utilized to imprint the customer's name, address and account number from the embossed card onto a sales slip. In oil station applications the data recorders imprint all of the above data and, additionally, are usually provided with key set levers for imprinting variable data such as the money amount of the sale.

More recently data recorders have also been introduced to the financial market and in particular to the banking industry. These data recorders are used to imprint deposit slips and the like with the customer's name and account number from the embossed plastic card, and are also provided with a dater to imprint the date and an auxiliary embossed plate to validate the form. However, in order to permit automatic machine sensing of the imprinted forms, the American Banker's Association has adopted the use of a stylized set of characters to be used for imprinting the account number. These characters are referred to as magnetic ink character recognition symbols or, more briefly, MICR characters.

Although the use of MICR characters has greatly increased the speed and efficiency with which the imprinted forms can be sorted, a considerable amount of difficulty has been encountered in the imprinting of the MICR characters on the forms. In this connection, because of the critical tolerances required by the automatic sensing equipment to properly read the MICR characters, it is necessary that the characters be positioned within a certain limited area on the form, that they be of uniform density to provide the proper amount of magnetic pigment deposition on the form to obtain a strong signal when being sensed, and that they be free of ragged or jagged outlines which might cause spurious signals resulting in erroneous reading and sorting operations. The present invention will be described [illegible] terms of these MICR characters, but it will be understood that characters intended for optical recognition and other types of critical reading characters are also comprehended.

Heretofore several improvements have been made to data recorders for imprinting forms and documents with machine scannable data, as well as to the forms utilized with these recorders. The improvements to the data recorders comprise such things as compensating platens or anvils to obtain a uniform degree of printing pressure even though the thicknesses of the embossed card and/or the form may vary from one application to another. Still other features include means to raise the platen after the form is imprinted to prevent double imaging of the form when the platen is restored to its start position.

A recently designed form which has proven successful in MICR imprinting applications is disclosed in U.S. Patent No. 3,113,516. As shown therein, the form comprises a carbon interleaved set in which one of the sheets is provided with a magnetic coating and the sheet immediately above the coated sheet in the set is provided with a notch die cut into one of its edges. In this way the back side of the coated sheet is exposed at the top of the set and, in the area of the notch, is the uppermost sheet in the set. In use, the form is placed in the data recorder with the notch in registry with the embossed MICR characters on the plastic card and the back side of the coated sheet in contact with the characters. When an impression is made, the platen pressure in the area of the notch is applied to the coated sheet and, as a result of the decreased thickness of the form set in the area of the MICR characters, the image created on the second sheet of the set is one having the clarity and sharpness required for automatic reading.

Although the foregoing improvements have met with a certain amount of success, it is an object of the present invention to further advance current practices of imaging form sets with characters having a high degree of clarity and outline accuracy through the use of small data recorders.

Another object of the present invention is to provide a data recorder for imprinting form sets from a printing plate having conventional embossed characters thereon as well as embossed coded data in such a way that the form set is imprinted to give an impression whose sharpness and clarity meets automatic reading requirements.

According to the present invention the foregoing objects are attained by providing a data recorder for imprinting a form set from a printing plate having two distinct groups of embossed characters thereon. The data recorder is provided with dual roller platens which are independently operative to imprint one group of characters with one of the platens when the platens are moved in a first direction across the form, and to imprint the other group of characters with the other platen when the platens are moved in the opposite direction across the form. In particular one of the platens is arranged to come into printing relation with a single line only of MICR type and to roll therealong from end to end without reaching any adjacent line of type. The uniformity of the pressure thus applied to the form set and embossed plate by the dual platen arrangement provides a clear, dense image of the MICR type on the form, which image is free of ragged outlines and has the degree of clarity and sharpness required for automatic reading.

It will be found that impressions made in this manner have a quality substantially equivalent to imprints made directly from inked type and, when the imprinted form is used as an input document for data processing equipment, the impression thereon will be accurately interpreted by the data processing equipment.

Other objects, features and advantages of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principles thereof now considered to be the best mode contemplated for applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

FIGURE 1 is a perspective view of a printing machine constructed in accordance with the present invention;

FIG. 2 is a sectional view on an enlarged scale taken substantially on line 2—2 of FIG. 1;

FIG. 3 is a front elevation of a platen roller assembly and certain associated parts;

FIG. 4 is a left-hand view of the platen roller assembly shown in FIG. 3;

FIG. 5 is a right-hand view of the platen roller assembly shown in FIG. 3;

FIG. 6 is a plan view of an embossed printing plate to be used in the present machine;

FIG. 7 is a diagrammatic end view on an enlarged scale showing the positions of the platen roller assembly and related positions of eccentrics associated with the assembly during the return stroke of the platen carriage and just before the forward stroke is started; and

FIG. 8 is a view similar to FIG. 7 showing the positions of the parts during the forward stroke of the platen carriage, and just before the return stroke is started.

The platen construction of the present invention provides a relatively simple arrangement which can be incorporated in various types of data recorders. For purposes of this specification, the novel arrangement is described as being incorporated in a machine such as shown and described, for example, in U.S. Patent No. 3,018,725. To the extent that it assists in understanding the description of the invention to be set forth is detailed hereinbelow, the disclosure in the patent is incorporated herein.

The data recorder of the present invention is shown generally at 10 in FIG. 1, and is adapted to produce impressions on a form from a printing plate P provided with embossed printing type characters TC and code embossures CE in the form of MICR characters. Since the data recorder of the present invention, with the exception of the platen roller assembly, is substantially the same as disclosed in the aforementioned Patent No. 3,018,725, only a brief description of the machine will be given herein.

With reference to FIG. 1 of the drawings, the data recorder comprises a bed having a top surface 12 provided with depending side walls 14 and 16 as shown in FIG. 2. The platen roller assembly is rotatably mounted in a carriage 18 having sides 20 and 22, FIGS. 1 and 2, and a handle portion 24 which is fastened to the carriage by means of screws indicated at 26 and 28. Sides 20 and 22 are each provided with a roller, designated 32 and 30 respectively, rotatably mounted on eccentric screws 36 and 34 respectively. The rollers are adapted to ride on edges of rails 17 and 15 of the side walls 14 and 16 respectively when the carriage is moved from one end of the machine to the other to produce an impression on the form. The eccentric mounting of the rollers 30, 32 permits adjustment of the platen roller in relation to the top surface 12 of the bed, thereby permitting adjustment to accommodate varying thicknesses of printing plates and forms.

In stabilizing and rigidly supporting the bed, resort is had to a pair of end cover caps 38 and 40 which afford the standards or legs for the machine. The end caps may also be provided with rubber feet as shown at 42 to prevent the machine from movement during an imprinting operation. At the same time, the end caps serve to support an elongate carriage guide rail 44 shown in FIG. 2. A pair of rollers 46 (only one being shown in FIG. 2) are rotatably mounted in a carriage guide 48, and cooperate with the guide rail 44 to guide and support the platen carriage for movement parallel to itself. The mechanism thus far described is fully disclosed in detail in the aforementioned patent.

The top surface 12 of the bed, as shown in FIG. 1, is provided with elements for activating a movable member, as will be explained hereinafter, comprising a pair of spaced racks 50 and 52. Rack 50 has an upstanding gauge surface 54 and rack 52 has gauge surfaces 55, 56 and 58 for the purposes to be explained below. Also affixed to the top surface 12 of the bed, at the side opposite the rack elements, are a pair of corner gauges 60 and 62. A further corner gauge 63 is positioned on top surface 12 at a position intermediate the rack elements and has a guide surface 65 in line with gauge surface 58 of the rack element 52 and a guide edge 64 hereinafter described. A pair of gauges 66 and 68, made of spring steel, are mounted to the underside of the bed and extend upwardly through openings 70 and 72 provided in top surface 12. These gauges are thus resiliently mounted so as to be depressed by the roller platen when the carriage is moved across the bed to imprint the form set. An embossed validating or station plate S is also attached by means 108 to the top surface of the bed at a position adjacent a dater D which is mounted to the underside of the bed and protrudes through an opening 69 in the top surface 12. Both the station plate and the dater are provided with reverse or printing type characters.

As will be seen in FIG. 1, printing plate P is accurately registered and held in place on the bed by being positioned between gauge surfaces 58, 65 and spring gauges 66 and 68, with one corner of the plate abutting edge 55 of the gauge 56 and another corner of the plate abutting edge 64 of the corner gauge 63. A form F to be imprinted, such as disclosed, for example, in the aforementioned Patent No. 3,113,516, is placed on the bed to overlie the printing plate P, station plate S and dater D, and is retained in registered position by the corner gauges 60, 62 and gauge surfaces 54 and 56 of the rack elements. To facilitate the placement and removal of the plate P and form F onto and from the bed of the machine, a cutout or recess 75 is provided at one side of the bed as shown in FIG. 1.

The novel platen roller assembly of the present invention is best shown in FIGS. 2 and 3 and comprises an axle indicated generally at 80, bushings 82 and 83, a movable member in the form of a segment gear 84, and a pair of platen rollers 86 and 88, platen 88 being of the same diameter as platen 86 but substantially shorter in length. Axle 80 comprises a pair of shaft sections 81 and 90, and a pair of ends subs 92 and 94 which project outwardly beyond the ends of the platen rollers 86 and 88 respectively. Shaft section 90 is eccentric to shaft section 81 and end stubs 92 and 94 are concentric to shaft section 81. The free ends of the stubs 92 and 94 are flattened at faces 96 and 98 as shown in FIGS. 4, 5, 7 and 8 for a purpose to be described hereinafter.

The bore of the platen roller 86 is lined with a solid sleeve 100 having a knurled fit to the bore of the platen roller, and bushings 102, 104 are mounted in the bore of the sleeve 100 at the two ends thereof, whereby the platen roller 86 is supported for free rotation relative to the shaft section 81. Platen 86 is further provided with a turned down annular end as shown at 106 in FIG. 2, which provides clearance for station plate retaining means 108 when the platen is moved across the plate to effect an imprinting operation. Platen roller 88 is provided with a smooth bore and is mounted for free rotation on shaft section 90 of the axle 80.

Stub 92 is pressed into an eccentric opening in bushing 82, having a flat section for drivingly engaging flat 96 on stub 92, and the other stub 94 is pressed into bushing 83, having a flat section for drivingly engaging flat 98 on stub 94. The bushing 83 is preferably molded integral with segment gear 84. The bushings 82 and 83 are supported for free turning movement in split bearing surfaces provided by downwardly facing arcuate surfaces 109 and 110 at spaced locations within the platen handle 24, and mating upwardly facing arcuate bearing surfaces 112 and 114 formed, for example, by straps secured to the under side of the platen carriage as indicated in FIG. 2.

Thus, it will be seen that shaft section 81 and platen roller 86 carried thereby are eccentrically arranged with respect to the bushing elements 82 and 83, and that platen 88 carried by shaft section 90 is also eccentrically arranged with respect to bushing elements 82 and 83 but in a different radial direction.

The angular relationship of these eccentricities is such that the bushing elements and the axle constitute eccentric actuating means for the platens, so that by rotating the bushing elements 82 and 83, the axes of the platen rollers can be vertically shifted as will be explained hereinbelow. This shifting action of the platen rollers is

afforded in order that one of the platens will be disposed in an effective position tangent to the imprinting plane during the forward stroke of the platen carriage, and that this platen will be raised to an ineffective position and the other platen lowered to an effective or imprinting position during the return stroke of the platen carriage.

The shifting of the platen rollers during the course of an imprinting operation is under control of the segment gear 84 in a manner similar to that described in the aforementioned patent. With reference to FIGS. 1 and 2, the platen carriage is shown in its home position wherein platen roller 88 is disposed in an imprinting level and roller 86 is in an ineffective level. In this position of the platen carriage, segment gear 84 (as viewed in FIG. 4 or as seen from the left in FIG. 2) is disposed as shown in FIG. 7. As the platen carriage is moved from left to right in FIG. 1 (in other words, from right to left when viewing FIG. 2 from the left hand side), the teeth of segment gear 84 first engage rack 50 on the bed of the machine. This engagement rotates bushing element 83 and, through the flat driving connections 96, 98, the bushing 82 in a countercolckwise direction as viewed in FIG. 7. Because of the driving connection between the bushings and the end stubs of the axle 80, the platen roller assembly is, of course, also rotated with the bushing elements.

As the teeth of the segment gear 84 leave the rack 50, the segment gear and platen rollers have been rotated a little over 100° to the positions shown in FIG. 8. It will be observed that in this position shaft section 81 is lowered and shaft section 90 is raised thereby disposing platen roller 86 at an imprinting level and platen roller 88 at an ineffective level. Continued movement of the platen carriage across the bed of the machine is effective to imprint the form from the embossed data TC on the plate P, as well as from the station plate S and the dater D, utilizing platen roller 86. As the platen carriage reaches the right hand end of the machine as viewed in FIG. 1, the lead tooth on segment gear 84 merely idles over the rack 52 and no significant motion is imparted to the platen roller assembly. At this stage of operation, the platen roller assembly and related parts are in the positions shown in FIG. 8.

On the return stroke of the platen carriage, segment gear 84 engages rack 52 and rotates the platen assembly in a clockwise direction as viewed in FIG. 8. Thus, shaft section 90 is lowered and shaft section 81 is raised thereby disposing platen roller 88 at an imprinting level and platen roller 86 at an ineffective level. As the platen carriage continues to be moved across the bed of the machine, platen roller 88 is effective to imprint the form from the embossed data CE on the plate P. Also, when the platen carriage approaches its home position, the lead tooth on segment gear 84 idles over rack 50 without imparting any rotation to the platen roller assembly. At the home position of the platen carriage, the segment gear and platen roller assembly are in the positions shown in FIG. 7 and are ready for another imprinting operation.

The gear segment 84 has formed thereon a detent configuration 111 which cooperates with a spring-pressed plunger 113 (FIG. 2) to provide for releasable retaining the platen assembly in either of its terminal positions similar to the arrangement shown in U.S. Patent 3,018,725.

From the foregoing, it will be appreciated that platen roller 86 is effective to imprint the form from the embossed data such as TC on plate P, as well as from the station plate S and the dater. The imprinting of these data takes place when the platen carriage is moved from left to right as viewed in FIG. 1, during which time platen 88 is raised. The return stroke of the platen carriage raises platen roller 86 out of printing engagement with the form and the printing devices and, at the same time, lowers platen roller 88 into printing engagement with the form to effect imprinting from the embossed MICR characters on plate P.

This novel, dual-platen roller construction of the present invention has been found to produce extremely high quality impressions on carbon interleaved forms or, more particularly, on forms interleaved with magnetically coated sheets. These results are achieved through the use of a dual platen roller assembly wherein the printing of the MICR characters is accomplished by rolling line contact and under circumstances such that the printing pressure on the embossed MICR characters is not influenced by any parallel embossed lines on the printing plate. Accordingly, the impression made from the MICR characters utilizing a separate roller platen rolling lengthwise of the line of characters, is of a quality such that when the imprinted form is used as an input document for data processing equipment, the impression thereon has the clarity and sharpness to afford accurate interpretation by the data processing equipment.

While the preferred embodiment of the invention has been described and illustrated, it is to be understood that this is capable of variation and modification. Accordingly, the aim in the appended claims is to cover all such variations and modifications as may fall within the true spirit and scope of the invention.

What is claimed is:

1. A printing machine of the character described comprising means for holding a printing device in printing position in a plane; a platen carriage reciprocable adjacent said printing position in a path substantially parallel to the plane of the printing device; two roller platens rotationally supported on said carriage in end-to-end relation with their axes extending transversely of the direction of carriage motion and each movable between an extended position relative to said carriage in which its axis is shifted towards the plane of the printing device and a retracted position relative to said carriage in which its axis is more remote from the plane of the printing device than said extended position; means for shifting either platen to one or the other of said extended and retracted positions and simultaneously shifting the other of said platens to the opposite position; and means adjacent the carriage when the same is at each end of its path for operating said shifting means so that one platen is extended during motion of the carriage in one direction and the other is extended during motion of the carriage in the other direction.

2. A printing machine of the character described comprising means for holding a printing device in printing position in a plane; a platen carriage reciprocable adjacent said printing position in a path substantially parallel to the plane of the printing device; two roller platens rotationally supported on said carriage in end-to-end relation with their axes extending transversely of the direction of carriage motion and each movable between an extended position relative to said carriage in which its axis is shifted towards the plane of the printing device and a retracted position relative to said carriage in which its axis is more remote from the plane of the printing device than said extended position; means for shifting either platen to one or the other of said extended and retracted positions and simultaneously shifting the other of said platens to the opposite position; said last-mentioned means comprising eccentric actuating means between said platens and the carriage, a movable member associated with said actuating means and bodily movable with the carriage, and a pair of activating elements cooperable with said movable member, one located adjacent each end of the platen carriage path.

3. A printing device as set forth in claim 2 in which the platens are mounted on an axle supported on the carriage for rocking motion about a fixed axis, and in which the eccentric actuating means comprises two portions of the axle eccentrically disposed with respect to said axis and each other.

4. A printing device as set forth in claim 3 in which the eccentric actuating means comprises an axle with end stubs; and a shaft portion for one platen coaxial with said end stubs; a shaft portion for the other platen eccentrically arranged with respect to said end stubs and bushings drivingly and eccentrically arranged on said end stubs.

5. A printing device as set forth in claim 4 in which the movable member is integrally formed with one of said bushings.

6. A printing device as set forth in claim 2 in which the movable member integrally associated with one of the bushings comprises a segment gear, and the activating elements include a pair of racks arranged to mesh with said segment gear.

7. A method of making an impression on a form set from an embossed printing device which utilizes a carriage movable in opposite directions between a first and a second position and having a pair of roller platens rotatably supported thereon, rolling one of the platens in printing relation to one portion of the printing device with the other platen in non-printing relation to another portion of the printing device when the carriage is moved in one direction, and rolling the other platen in printing relation to the other portion of the printing device with said one platen in non-printing relation to said one portion when the carriage is moved in the opposite direction.

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WILLIAM B. PENN, *Primary Examiner.*

Sept. 12, 1967 J. H. GRUVER ETAL 3,340,800

DUAL ROLLER PLATENS IN ADDRESS PRINTING MACHINES

Original Filed April 25, 1963 7 Sheets-Sheet 1

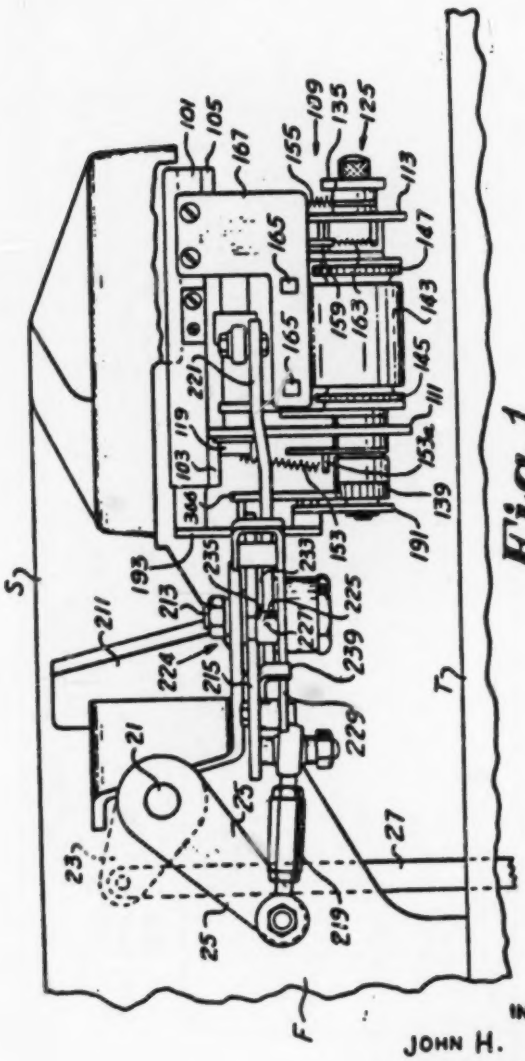

Fig. 1

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DUAL ROLLER PLATENS IN ADDRESS PRINTING MACHINES

Original Filed April 25, 1963 7 Sheets-Sheet

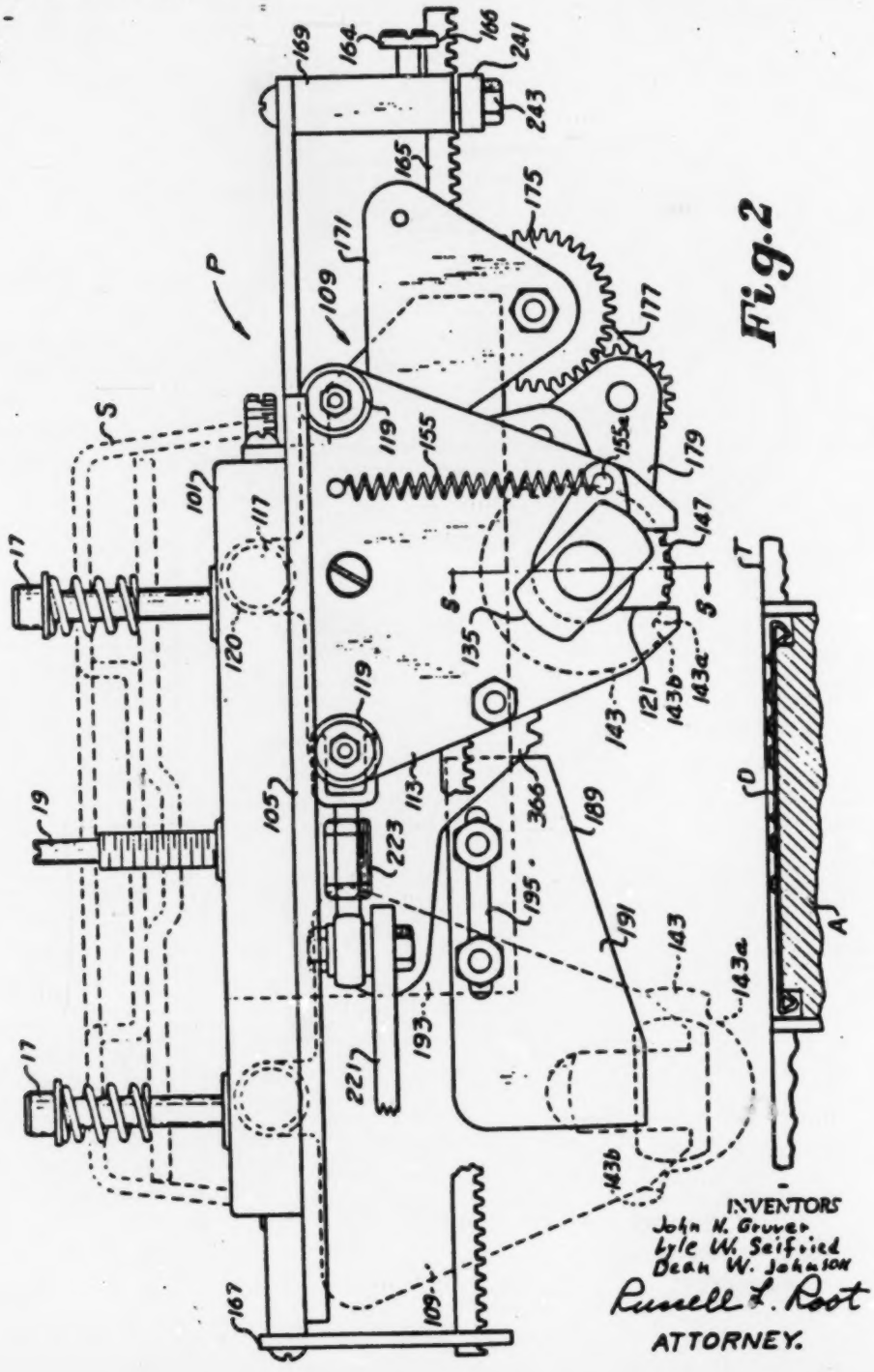

Fig. 2

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DUAL ROLLER PLATENS IN ADDRESS PRINTING MACHINES

Original Filed April 25, 1963 7 Sheets-Sheet 3

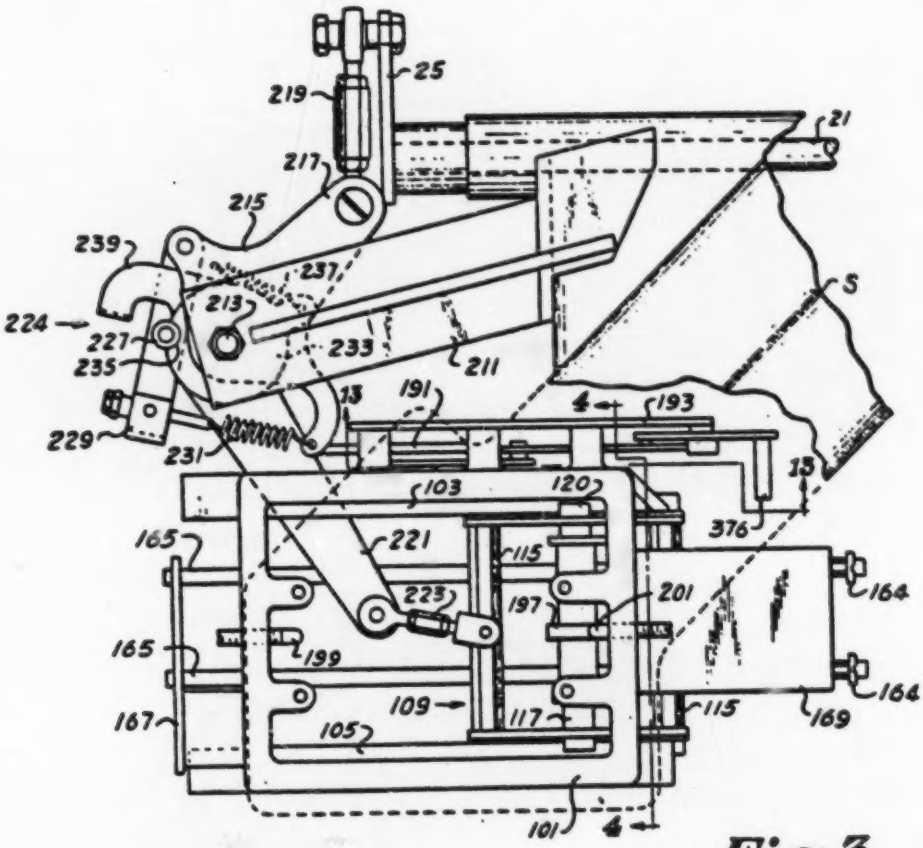

Fig.3

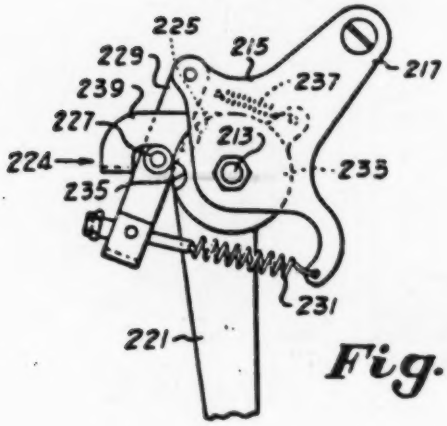

Fig.3a

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Sept. 12, 1967 J. H. GRUVER ETAL 3,340,800

DUAL ROLLER PLATENS IN ADDRESS PRINTING MACHINES

Original Filed April 25, 1963 7 Sheets-Sheet 4

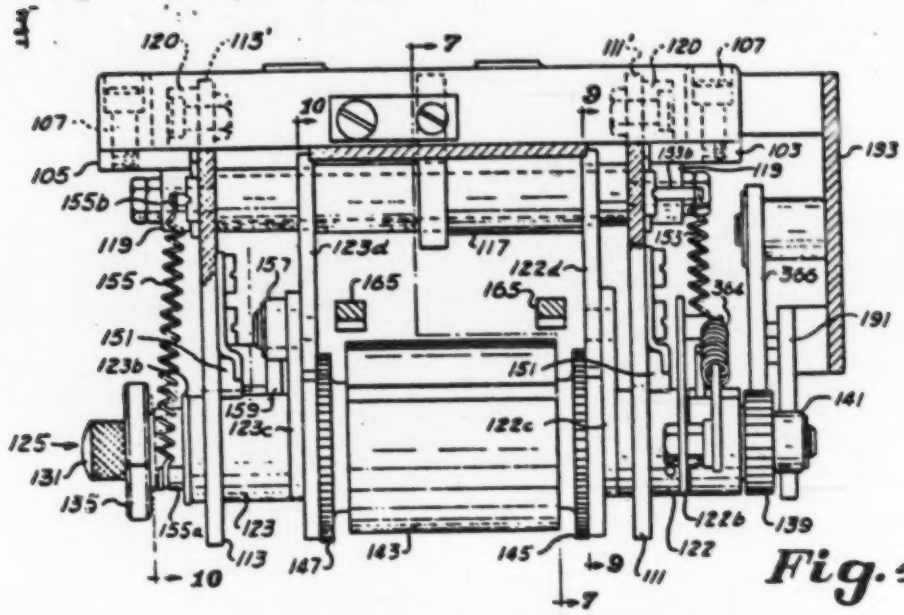

Fig. 4

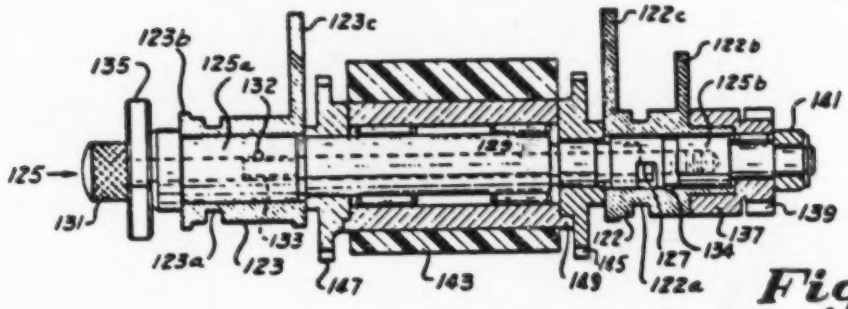

Fig. 5

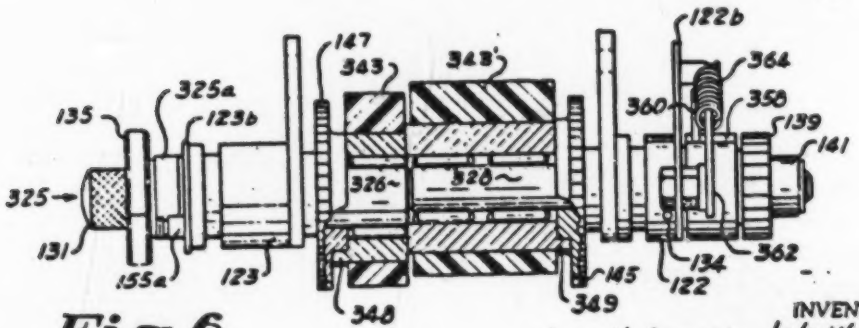

Fig. 6

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Sept. 12, 1967 J. H. GRUVER ETAL 3,340,800

DUAL ROLLER PLATENS IN ADDRESS PRINTING MACHINES

Original Filed April 25, 1963 7 Sheets-Sheet 3

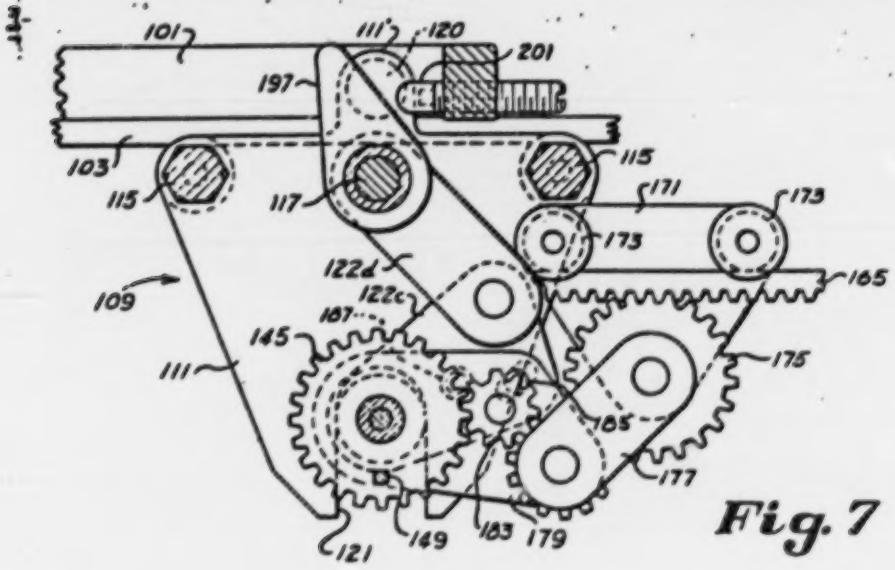

Fig. 7

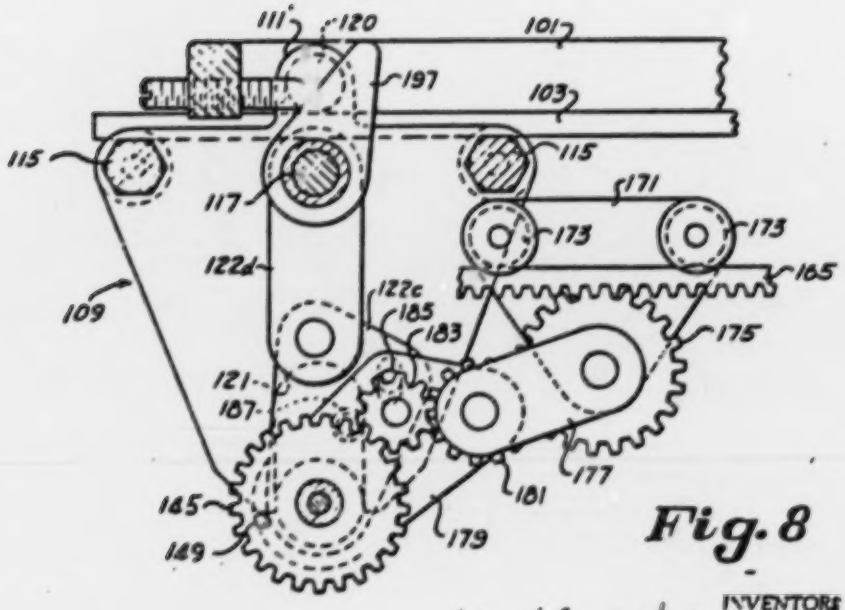

Fig. 8

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DUAL ROLLER PLATENS IN ADDRESS PRINTING MACHINES

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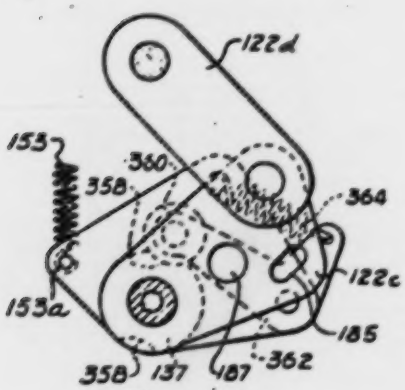

Fig. 9

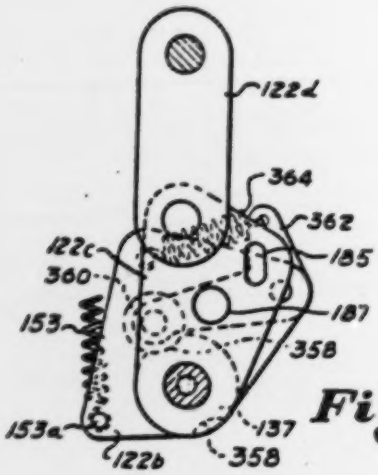

Fig. 11

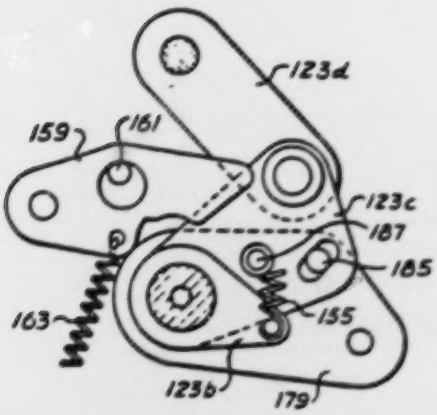

Fig. 10

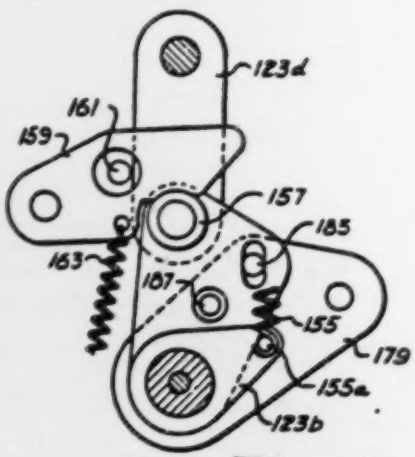

Fig. 12

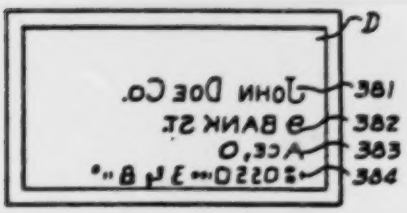

Fig. 15

Fig. 16

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Original Filed April 25, 1963 7 Sheets-Sheet 7

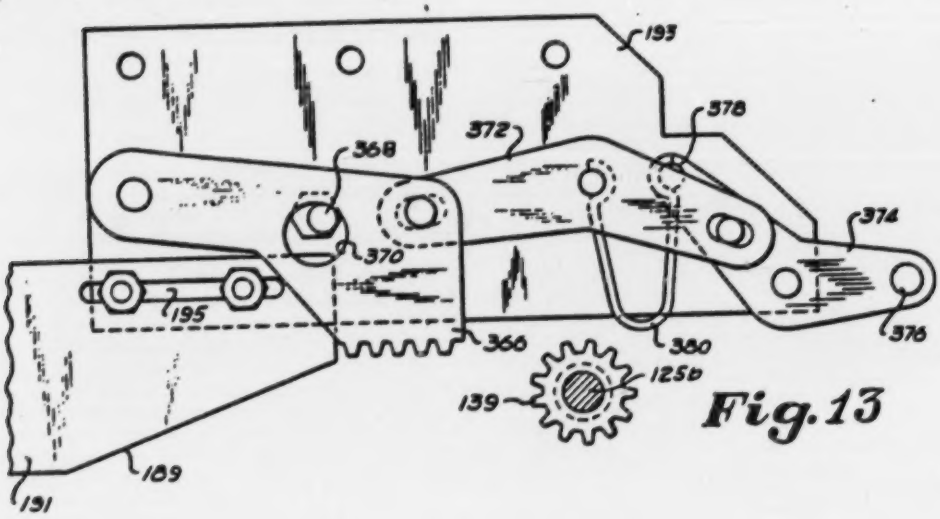

Fig. 13

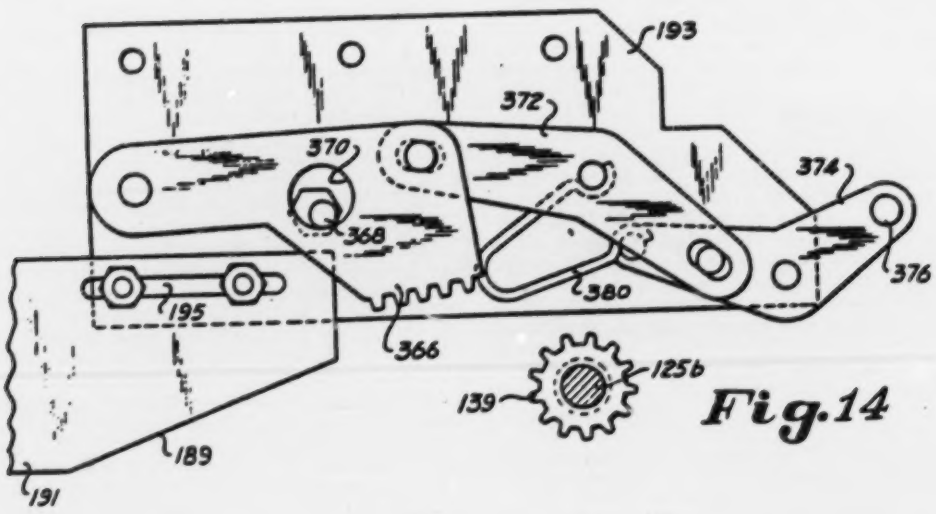

Fig. 14

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DUAL ROLLER PLATENS IN ADDRESS PRINTING MACHINES

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Continuation of application Ser. No. 275,608, Apr. 25, 1963. This application Mar. 21, 1966, Ser. No. 547,114

12 Claims. (Cl. 101—56)

This invention relates to a method of printing and to printing machines, and more particularly to platen mechanisms for use therein.

This application is a continuation of application Ser. No. 275,608, filed Apr. 25, 1963 (now abandoned).

In printing machines of the character through which small plates or printing devices are sequentially passed and in which machines the platen mechanism of the present invention is particularly useful, the platen mechanism functions to effect printing operations from the respective printing devices in a series thereof passed sequentially and in a step-by-step manner through the machine. One or more printing impressions may be made from each of the printing devices, the platen mechanism being operated through the printing or impression forming cycle each time such a printing impression is to be made.

The plates or printing devices from which the printing impressions are formed in such machines may take many different forms, but in most instances each printing device carries a plurality of lines of printing characters such as embossed type from which printing impressions may be made upon a document by means of a ribbon of transfer material lying between the printing device and the document.

A printing machine of the general kind here referred to is illustrated in U.S. Patent No. 2,359,849. In the machine disclosed in that patent, the platen is arranged to have a printing motion such that it rolls away from the operator in a direction which is usually parallel to the shorter dimension of the printing devices used, but in any event is perpendicular to the direction in which the lines of type on the printing device extend, thereby printing all of the characters on a single line at one time. This is beneficial from the standpoint of allowing the platen to have the shortest stroke possible and thereby contributes to the end of achieving maximum machine speed.

It has, however, been determined that the quality of impression obtainable with the prior machine falls slightly short of the requirements which certain special applications inherently demand. One example of such special application is the making of impressions in accordance with American Bankers Association specifications for E-13B magnetic code printing where the result is required to be sensed automatically with a stated degree of accuracy. Such impressions are of course, made with a transfer element of the carbon paper type rather than the more usual ink impregnated cloth ribbon. Even then, apparently, when the printing device is prepared by embossing sheet metal or sheet plastic, it seems to be impractical to secure characters such that a printing pressure value sufficiently constant over all areas of each individual character can be achieved when the printing operation is conducted using the prior printing machine and platen.

It is accordingly an object of the present invention to provide a method and machine capable of using embossed sheet material printing elements, and taking an impression therefrom in a way such that improved character reproduction can be secured.

In particular it is also an object of the invention to provide a method and machine capable of taking impressions from printing devices of sheet material with the characters thereon formed by embossing, in which the characters include E-13B type, and which impressions are of sufficiently high quality to meet current American Bankers Association specifications.

According to the present invention, it has been found possible to improve the impression from an embossed printing element by power driving a platen roller parallel to the lines of characters on a printing device to take an impression therefrom, and particularly to so construct the equipment that a single one of several adjacent lines of characters only can be embraced in the printing operation.

It is also an object of the invention to provide a method and arrangement whereby various portions of a printing legend on a printing device may be selected individually for printing by a platen motion along the lines of type on the printing device.

Still another object of the invention is the provision of a roller platen mechanism capable of operating by a rolling action along the lines of type on an embossed printing device, which mechanism is compatible with the basic machine drive and frame of previous powered roller platen address printing machines.

Still another object of the present invention is the provision of a roller platen printing machine capable of automatically taking an impression from one zone of a printing device on a first pass, and alternately taking an impression from a second zone of the printing device on a second pass, and repeating such a cycle with each successive printing device.

A further object of the invention is the provision of a roller platen printing machine wherein the platen may be selectively set for automatic alternation in accordance with the foregoing object, or for continuous operation taking successive impressions from the same zone of a printing device at every cycle.

A still further object of the invention is the provision of a method and device for taking impressions where plural separate platen passes are required to provide a complete impression, but wherein ribbon consumption is not excessive, even though ribbon feeding action may be mechanically tied to the platen cycle.

An additional object of the invention is the provision of a simple effective throwout mechanism related to a bell crank in the platen drive linkage for protecting the equipment and the operator in case an extraordinary load is imposed on the drive for any reason during a printing cycle.

Other objects, features and advantages will appear hereinafter as the description proceeds.

In the drawing:

FIG. 1 is left side elevation of the upper portion of a printing machine showing the platen supporting and moving equipment of the device of the present invention;

FIG. 2 is a front elevation to a larger scale showing the platen supporting and moving equipment of FIG. 1;

FIG. 3 is a top plan of the device shown in FIG. 1 with a portion of the platen support arm broken away to show the parts more clearly;

FIG. 3a is a detail plan similar to a portion of FIG. 3, but showing the platen drive linkage in throw-out position;

FIG. 4 is a section taken substantially on line 4—4 of FIG. 3, but drawn to a larger scale;

FIG. 5 is a detail section of the platen shaft taken substantially on line 5—5 of FIG. 2;

FIG. 6 is detail elevation partly in section, taken generally from the direction of FIG. 5, but illustrating an alternate form of platen;

FIG. 7 is a section taken substantially on line 7—7 of FIG. 4;

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FIG. 8 is a section similar to FIG. 7, but showing the parts in printing position;

FIGS. 9 and 10 are detail sections taken respectively substantially on lines 9—9 and 10—10 of FIG. 4, with platen frame members omitted for clarity;

FIGS. 11 and 12 are detail sections corresponding respectively to FIGS. 9 and 10, but showing the parts in printing position;

FIG. 13 is a detail section taken substantially on line 13—13 of FIG. 3, but drawn to a larger scale and showing the automatic platen shift mechanism in operative position;

FIG. 14 is a detail section similar to FIG. 13, but showing the automatic platen shift mechanism in inoperative position;

FIG. 15 is a face view of a printing device of the type designed for use with the machine of the invention in one of its forms; and

FIG. 16 is diagrammatic plan showing the relationship of certain impressions to the carbon ribbon used with the device of the invention.

General

Referring to the drawing the printing machine of the present invention includes a desk-like frame (not shown) which comprises a table-top T from which projects upwardly and then parallel thereto the upper section or stamper arm S of a generally C-shaped printing frame F, the lower arm of which (not shown) is structurally associated in a known manner with a printing anvil A (FIG. 2) which lies just beneath an opening in the table-top T. The machine, as with previous devices of this nature, is designed to progress embossed printing devices D (FIG. 2) along tracks with a stepping motion to bring each of the devices D in turn into printing position above the anvil A. Referring to FIG. 3, the direction of this motion of the device D is generally from top to bottom of the figure (that is, from the back of the machine towards the front thereof) with the character lines on each device D extending from left to right.

In order to take impressions from the device D on anvil A, the distal end of stamper arm S supports a platen mechanism P which comprises elements which can be brought into rolling pressure contact with the back surface of a document overlying the printing device D. As seen in FIG. 2, the platen mechanism P is supported beneath the stamper arm by adjustable support means 17, 19 of a known type permitting leveling of the platen and accurate adjustment of printing pressure. The stamper arm S also includes platen driving mechanism including a rock shaft 21 drivingly connected to an input arm 23 and an output arm 25. The shaft is oscillated through an angle of about 75° by a drive link 27 connected to input arm 23, which link is reciprocated in a well known manner by the machine mechanism so that the tip of arm 25 oscillates along a line perpendicular to the lines of characters on printing device D.

The description thus far relates essentially to previous equipment of known design upon which the machine of the present invention is based.

The present machine differs from the previously known equipment primarily in the makeup of the platen mechanism P which includes a platen mechanism frame casting 101 to which are attached a pair of rails 103, 105 by screws 107 (FIG. 4). The rails run parallel to the front of the machine and also parallel to lines of characters on the printing devices D. A platen carriage 109 is made up of end plates 111 and 113 joined by tie rods 115 and an upper central rock shaft 117. The opposite ends of the rods 115 outside the plates 111 and 113 carry rollers 119 for engagement with the lower surfaces of tracks 103 and 105, and the plates 111 and 113 each have a central ear 111' and 113' respectively upwardly extending between the tracks and carrying a roller 120 engaging the upper surface of the adjacent track.

The lower portions of end plates 111 and 113 are formed with downwardly opening slots 121 each of which slidably and rockably embraces a bushing. These bushings are best seen, perhaps in FIGS. 4 and 5, wherein the bushing embraced by the slot 121 in plate 111 is designated 122, while that embraced by the slot 121 in plate 113 is designated 123. The bushings each have an annular groove, designated 122*a* and 123*a* respectively, for receiving and being guided by the plate margins adjacent the corresponding slot. Bushing 122 includes an integral spring anchor arm 122*b* and an integral toggle link 122*c*. Similar elements 123*b* and 123*c* are integrally associated with the bushing 123.

These bushings are designed to support a platen shaft assembly 125, for rocking movement about its axis, and to move the same bodily in a vertical direction laterally of its axis. The bushings 122 and 123 together with the platen shaft assembly 125 constitutes a platen support means.

The platen shaft assembly comprises a central shaft made up of two sections 125*a* and 125*b* which lock together by virtue of matching flats indicated at 127, and are held as a unit by a central threaded pin 129 which has a hand knob 131 and which passes through a central opening in shaft section 125*a* to thread into section 125*b* and clamp section 125*a* thereagainst. For convenience in disassembly, pin 129 is trapped within shaft section 125*a* by a cross pin 132 located adjacent a reduced section 133 of the pin 129. Shaft section 125*a* includes an integral knob 135. Shaft section 125*b* is supported within bushing 122 and at its free end is drivingly connected to a detent drum 137 and a shift pinion 139, the purpose of which will be subsequently explained. The distal end of shaft section 125*b* is occupied by a rotatable cam follower roller 141. The shaft section 125*b* is preferably trapped within the bushing 122 by a cross pin 134 to simplify assembly of the parts.

On the platen shaft assembly between the bushings 122 and 123 is rotatably supported a platen roller 143 flanked by platen gears 146 and 147. The platen roller is keyed to at least one of said gears (gear 145 in the form shown) by a tongue 149 fitting into a corresponding recess in the gear.

Cushioning stops 151 are attached to plates 111 and 113 for determining the uppermost positions of the bushings 122 and 123, and tension springs 153 and 155 are provided for urging the bushings towards upward position against the stops 151. Spring 153 is connected between a pin 153*a* on spring anchor arm 122*b* and a spring perch 153*b* on plate 111. Spring 155 is similarly connected between a pin 155*a* on spring anchor arm 123*b* and spring perch 155*b* on plate 113. It can thus be seen that the platen shaft assembly 125 normally hangs in bushings 122 and 123 which are normally held in raised position by springs 153 and 155.

Also exerting control over the positions of the bushings 122 and 123 are a pair of toggles (FIGS. 4 and 9 to 12). The first toggle coacts with bushing 122 and includes link 122*c* heretofore mentioned, and an actuating arm 122*d* pivotally connected thereto. The opposite end of arm 122*d* is rigidly connected to rock shaft 117. The second toggle coacts with bushing 123 and includes link 123*c* and an arm 123*d* also rigidly attached to rock shaft 117. The pivot point of the toggles 123*c*, 123*d*, includes a detent roller 157 designed for engagement with a detent catch 159 pivotally mounted on plate 111 and urged downwardly against a stop 161 by a spring 163 (see FIG. 10). From the foregoing it can be seen that the toggles are constrained for conjoint movement by reason of the rigid connection of arms 122*d* and 123*d* with the shaft 117.

The platen carriage 109 is designed for reciprocation along the tracks 103, 105, and when the platen 143 is in lowered position it will provide rolling pressure for making an impression upon a document superimposed upon

the printing device D. In order to insure proper rolling contact with the document, the platen is positively driven durings is traverse. This is accomplished by the following mechanism, which includes a pair of racks 165 extending parallel with the direction of platen carriage motion and supported at their ends in brackets 167 and 169 mounted on the frame casting 101.

Each rack supports a small gear carriage which includes a plate 171, flanged rollers 173, 173 and a gear 175 underlying and meshing with the rack (FIGS. 7 and 8). A gear support linkage system connects the axis of each gear 175 with the axis of one of the platen gears 145 and 147. Taking gear 145 as an example, a link 177 is pivoted at one end of the axis of its gear 175, and at the other pivotally joins a second link 179 which has its free end encircling the hub of gear 145. Link 179 carries a first idler pinion 181 at the axis of its pivotal connection with link 179, which idler pinion has a diameter selected so as to mesh with gear 175. A second idler pinion 183 mounted on the link 179 meshes with both idler 181 and gear 145. The link 179 is loosely connected with the adjacent toggle link 122c by the pin and slot connection 185 and the pin and enlarged hole connection 187, so that the two move generally together as the toggle folds and straightens, but some slight relative motion is permitted for a purpose which will subsequently appear. The platen gear 147 has a similar drive system and the parts are identified by the same reference characters. Since the gear 145 is the only one presently keyed to the platen 143, of course its gear drive system is the only one acting on the platen in the present instance.

From the foregoing it can be seen that travelling of the platen carriage along the tracks 103, 105 causes the gear carriages to slide along the racks 165 with a consequent positive driving of the platen gears 145 and 147 through their respective trains of idler pinions 181, 183, and the corresponding rack engaging gear 175. The ratio of the pitch diameter of each gear 175 and its corresponding platen gear 145 or 147 is selected to give a peripheral platen speed equal to the speed of platen travel and thereby provide a smooth rolling action, and the platen is thus positively driven regardless of whether it is raised or lowered or in any intermediate position.

Means are provided for raising and lowering the platen at appropriate points in the reciprocatory movement of the platen carriage. Turning to FIG. 2, as the carriage 109 moves towards the left, the platen will remain in its uppermost position for about one-half of the stroke. At that point the cam follower roller 141 on the end of the platen shaft will come into contact with a sloping cam surface 189 of a cam plate 191 secured to a side-plate 193 mounted on and depending from the casting 101. The cam plate mounting is preferably adjustable, as by slot 195, to permit accurate setting of the zone within which the platen is lowered. The cam surface 189 acts on the follower roller until the toggles 122*d*, 122*e* and 123*d*, 123*e* are nearly straight. Thereupon the action is completed by a toggle actuating lever 197 drivingly connected to shaft 117, which lever strikes an abutment 199 adjustably mounted in the casting 101. This action straightens the toggles to the FIG. 8 position where they are held by the engagement of catch 159 with detent roller 157 as seen in FIG. 12. The platen 143 is then in lowered position ready for printing. On the return stroke of the carriage 109, the platen 143 remains lowered and rolls across the printing area making the desired impression on a document placed above the printing device D. As the carriage nears home position, the toggle actuating lever strikes another adjustable abutment 201 (FIG. 7) which breaks the toggle, releasing it from catch 159 and allowing the platen to be raised by springs 153 and 155, ready to start another cycle.

The drive linkage for reciprocating the platen carriage 109 is best seen in FIGS. 1 and 3 and comprises a bracket 211 extended laterally from the stamper arm S and provided at its outer end with a pivot post 213. Pivoted on the post 213 for swinging movement in a horizontal plane is a first drive lever 215 having an arm 217 connected to the output arm 25 of rock shaft 21 by a link 219 having suitable spherical bearing connections. The output arm 25 may be considered the primary drive element for platen operation. Drive lever 215 has a normally driving connection with a secondary drive lever 221 also pivoted on post 213 and having its free end joined to the tie bar 115 of platen carriage 109 by a link 223. As stated above the first lever 215 and secondary lever 221 normally move as a unit as if they were an integral bell crank. There is provided between them, however, a throwout or overload connection 224 which includes a recess 225 in the hub of secondary lever 221, and a detent roller 227 normally drivingly occupying said recess. The roller 227 is carried on an arm 229 pivoted on the lever 215 and urged towards the hub of lever 221 by a spring 231. So long as the roller remains in recess 225 the arm 217 of lever 215, and lever 221 will maintain their relative angular relationship and the carriage 109 will travel through its normal stroke in response to oscillation of the output arm 25. In case any significant obstruction is presented to the motion of the platen carriage 109, e.g. an obstacle such as the operator's hand beneath the platen as it seeks to move downwardly, the extra load offered will cause the roller 227 to lift out of the recess 225 against the force of spring 231 and roll idly around the hub of lever 221 which will then remain in its stalled position as seen in FIG. 3*a*. In order to insure that the drive does not reengage on a subsequent cycle before the obstruction is cleared, a safety latch in the form of a circular plate 233 matching the hub of lever 221 and having a recess 235 corresponding to recess 225 is provided between the levers on pivot post 213. A spring 237 urges the latch in a direction to misalign the recesses 225 and 235. Therefore, as soon as the roller is displaced from recess 225, the latch swings to close it and to present a continuous hub periphery to the roller 227. Thereafter no driving action is imparted to the lever 221 until the latch 233 is restored to a position with the recesses 225 and 235 aligned and the roller 227 is again allowed to drivingly engage in recess 225. In order to simplify resetting of the latch, the plate 233 is provided with an arm 239 by which it can be manually swung to recess-aligning position against the force of spring 237.

One feature of the present invention relates to effecting an accurate cut-off point to the printing pressure. As can be seen in FIG. 2, it is customary to trim away sections of the platen as indicated at 143*a* to produce an edge 143*b* and make the printing surface of the platen correspond approximately in length to the area to be printed. One end of this area (at the left in FIG. 2) will usually be relatively indeterminate because the lines of characters may vary in length. However, these end characters are usually rather remote from the limits of the printing area and do not offer a problem. At the other end, however (to the right in FIG. 2), the margin is usually straight and the end characters often approach rather closely to the edges of the ribbon guide or other printing area limiting member on the machine. In order to secure a neat impression it is desirable to have the edge of the cut-away platen give full coverage on the type characters and still avoid reaching as far as the limiting member, since rolling over the latter is likely to give a false impression or smudge which is manifestly undesirable. It is known, of course, to control platen area coverage by accurately trimming the platen to place its edge 143*b* exactly where required. Since this must usually be effected by removing the platen from the machine, it is a troublesome and sometimes annoying operation. Moreover it provides a fixed result which does not admit of making adjustments for slight differences in the printing situation that may arise, unless additional platens are constructed for each such situation. In accordance with the present invention

it is necessary to have a single platen for most conditions within a substantial range. This platen may be trimmed to provide cut-off edge 143*b* which is only approximately where required. An accurate final setting is achieved on the machine by adjusting the lengthwise position of the rack 165 drivingly associated with the platen (i.e. the right-hand rack in FIG. 4). To this end the racks 165 have slidable mounting in the brackets 167 and 169 and their endwise positions may be set by adjusting screws 164 whose heads are arranged to fit into matching recesses 166 in the upper surface of the rack (FIG. 2). It will be realized that endwise shifting of the rack 165 will, through gear trains 175, 181, 183, 145 bring about a small angular motion of the platen relative to that position determined by the home position of the platen carriage 109. Accordingly the line where platen edge 143*b* terminates the printing action will be shifted a corresponding amount. When the correct platen position is achieved, the adjustment can be secured by tightening a clamping bar 241 against the racks 165 by means of screws 243.

In the operation of the machine the cycling of the platen is controlled by the oscillation of output arm 25 which moves in time with the feeding forward of printing devices D in a manner well known. As the arm 25 moves forward from its home position as seen in FIG. 1, it will rock the bell crank, made up of levers 215 and 221, in a clockwise direction (FIG. 3) thereby drawing the platen carriage 109 to the left in FIGS. 2 and 3 along rails 103, 105. It will be understood that during this leftward movement a previously used printing device D is being discharged from printing position and being replaced by another from which an impression is about to be taken. Approximately midway of the leftward travel of the carriage 109, cam follower roller 141 encounters the cam surface 189 which gradually lowers the platen shaft assembly 125 in opposition to the force of springs 153 and 155. As the carriage 109 approaches its leftward limit of movement, the toggle actuating lever 197 strikes abutment 199 to complete straightening of the toggles 122*c*, 122*d*, and 123*c*, 123*d*. The platen is thereupon held in down position by the engagement of detent roller 157 with the catch 159. This brings the output arm 25 to the end of its forward travel so that it reverses and starts to move rearwardly, swinging the bell crank 215, 221 in a counterclockwise direction (FIG. 3), resulting in movement of the platen carriage 109 towards the right with the platen 143 in lowered position. During this movement to the right the now-lowered platen takes an impression from the printing device D therebeneath. As the carriage 109 approaches the limit of its travel towards the right, the toggle actuating lever 197 strikes abutment 201 to break the toggle and permit raising of the platen shaft assembly 125 by springs 153 and 155, restoring the parts to home position ready for another cycle. It will be understood from the previous description that if at any time during the motion of the platen carriage 109 a load substantially higher than that normally occasioned by a printing action is introduced, the throwout mechanism 224 will become effective and the levers 215 and 221 will lose their interconnection and become free to change their angular relationship as indicated in FIG. 3*a*. Safety latch 233 will then prevent a reconnection of the levers so that the output arm 25, link 219 and lever 215 will continue to idle without driving lever 221 until the obstruction introducing the load has been cleared and the arm 239 has been operated to disable the safety latch and restore the driving connection between levers 215 and 221.

The form of the invention described above represents a simpler construction using a single platen roller. The equipment, however, is capable of handling more than one platen roller for certain applications, and this is the form which is presently preferred. The mechanism employed is in all respects the same, except that a modified platen shaft assembly 325 is used in place of the shaft assembly 125, and the main features of this shaft are illustrated in FIG. 6. The assembly is made up of a first shaft section 325*a* and a second shaft section 125*b*, the latter identical with that in the FIG. 5 form. The two shaft sections are also connected by a threaded pin 129 with knob 131 as in the FIG. 5 form. The essential difference between the constructions is in the configuration of the first shaft section 325*a* which, instead of having central concentric bearing portions, is provided with two bearing portions 326 and 328, whose axes are each offset from the axis of the shaft 325 with an eccentricity of about .025 inch, and preferably in opposite directions. The bearing portion nearest the second shaft section 125*b*, i.e. portion 328, is also of smaller diameter than the bearing portion 326 to permit assembly and disassembly of the parts. Mounted for rotation in bearing portion 326 is a short platen roller 343 and beside it the platen gear 147 to which it is keyed by a platen projection 348 received in a corresponding recess in the gear. Mounted for rotation on bearing portion 328 is a longer platen roller 343' and the platen gear 145 to which it is keyed by a projection 349 received in a corresponding recess in the gear.

It can be seen from the foregoing that an arrangement is provided by which either of the two platen rollers can be brought into operative position for printing while the other is shifted to inoperative position. In FIG. 6 the short platen 343 is in operative position and platen 343' is inoperative. If the shaft section 325*a* were rotated 180° the eccentricity of the bearing portions 326 and 328 would retract platen 343 and move the platen 343' to operative position. This shifting motion can be manually effected by knob 135 which forms a part of shaft section 325*a*. In order to determine the proper platen locating positions for the shaft assembly 325, it will be noted that the detent drum 137, which is drivingly connected to the shaft section 125*b* as in the FIG. 5 form, has two oppositely directed recesses 358 (see also FIG. 9). These are intended for engagement with a detent roller 360 carried by lever 362 pivoted on spring anchor arm 123*b* and urged by a spring 364 in a direction such that the roller 360 is forced into the detent drum recesses 358. The shaft assembly 325 may, therefore, be snapped into either of two positions so that one platen roller or the other is operative, and be held in the selected position by the roller 360 until a subsequent shift is effected.

The preceding paragraph describes how the desired platen roller 343 or 343' may be selected by manual shifting. Means is also provided, however, for effecting such shifting automatically in certain cases. With particular reference to FIGS. 4, 13 and 14, the sideplate 193 of the platen assembly P has pivoted thereon a short rack element 366 swingable between a lower operative position and an upper inoperative position determined by a stop pin 368 extending through opening 370 in the rack. In the lower position the teeth of rack 366 lie in the path of the shift pinion 139 as the platen carriage 109 moves towards the left with the platen shaft raised, but are, of course, out of the path of the pinion 139 when platen carriage moves towards the right with the platen lowered. The length of the rack 366 is such as to produce about one-half turn of pinion 139 and hence of shaft assembly 325. A pivoted intermediate lever 372 is connected at one end with the rack 366 and at the other with a manual control lever 374 provided with a handle 376. Both levers are pivoted on sideplate 193. Acting between the pivot of lever 372 and a pin 378 on an extension of lever 374 is an over-center spring 380 which causes handle 376, and hence rack 366, to snap to either "up" or "down" position and to hold both in such position until forcibly changed. Thus when the handle 376 is down, as seen in FIG. 13, each leftward traverse of the platen carriage 109 will result in 180° rotation of pinion 139 and shaft assembly 325, and the platens will automatically alternate in occupying opera-

tive position. When the handle 376 is raised, the rack 366 becomes inoperative, and whichever platen is selected will remain in operative position until a change is desired.

In general the operation of the preferred form of the device is like that of the simpler form described above, and a detailed description thereof is accordingly unnecessary. It will suffice to point out that the pin and slot connection 185, and the pin and enlarged hole connection 187 come into play when the preferred platen shaft assembly 325 is in use. Since the gear support links 179 are each rockable on the hub of the corresponding platen gear 145 or 147, they are of course slightly eccentric to the main shaft axis. The toggle links 122c and 123c and their attached bushings, on the other hand, are rockable on concentric surface portions of the shaft 325a, 125b. It is apparent therefore, that during the platen shift operation when the shaft assembly 325 is being rotated, some relative movement of these links must occur, and these connections 185 and 187 are arranged to accommodate this movement. The slot direction used in connections 185 is such that relative pivoting movement about the platen shaft of toggle link 122c or 123c and the gear support link 179 corresponding thereto is prevented. Accordingly, each platen can be maintained in an accurately determined angular position which is determined solely by the position of carriage 109 acting in cooperation with the rack 165.

In addition, the preferred form of platen shaft assembly 325 provides for positively driving both platens, each of which is keyed to its platen gear (see projections 348 and 349). Accordingly each platen is rotated by its respective gear train from its rack 165 whenever the platen carriage 109 is moved. Moreover, the printing cut-off point of each platen is individually settable by means of the adjustment screw 164 associated with its corresponding rack 165 in the manner described for platen 143 above.

A printing device D of a type which the equipment of the present invention is especially adapted to handle is shown in FIG. 15. In the example shown the device D is a plate of sheet material embossed with printing characters. There are shown three lines of characters 381, 382 and 383 which are conventional in nature and a fourth line 384 in which the characters are special machine code characters, i.e., they are so configured as to provide for printing a known kind of magnetic code impression, commonly referred to as E-13B type. The printing device is therefore said to contain a plurality of closely spaced rows of impression characters in side-by-side relation, one row of which contains a series of machine recognition characters requiring a high order of impression uniformity to provide operative response. The equipment of the preferred form (FIG. 6) will normally be so designed that the longer platen 343' (FIG. 6) will operate in an area corresponding to type lines 381, 382 and 383, while the shorter platen 343 will operate in an area corresponding to type line 384, both platens, of course, rolling lengthwise of the type lines.

With the printing machines heretofore known, adjustments are provided such that each printing device D may be automatically held in printing position for two platen passes before discharge. When the machine is so adjusted, and with the handle 80 in lowered position, it can be seen that a first impression will be taken from lines 381, 382 and 383 on the first pass by platen 343', and a second impression will be taken from line 384 on the second pass by platen 343. Of course these can be reversed depending upon the angular setting of the shaft assembly 325 at the first pass. In this manner the impression taken from line 384, which is the impression having the most critical limitations, is wholly individual. The impression is made one small increment at a time which inherently corrects for variations in type levels along the line arising from minute embossing variations. More important, perhaps, each character in line 384 is imprinted by itself so that varying extraneous pressure influences which would be introduced by the presence or absence of characters in other lines being imprinted at the same time, are altogether avoided. Under these conditions, and using appropriate high fidelity carbon paper as the transfer medium for making the impression, it is possible to achieve a quality not heretofore regarded as practical when using embossed printing devices, and a quality which meets American Bankers Association specifications, whereby the impressions obtained are readable by automatic sensing equipment on a practical basis.

One important economic factor in the operation of printing machines of the type herein described is the consumption of transfer material. Inked cloth ribbons usually prove to be the most economical material for this purpose, but do not provide adequate impression quality for work involving machine sensing of code impressions. Carbon paper ribbon best answers the needs of such application but is quite costly by comparison, especially when ribbon of a complete transfer type is used. This means that the ribbon needs to be advanced the length of the printing area each time an impression is made to present an unused area for the next impression. A characteristic of the previously known printing machines of the type under discussion is that ribbon advance is mechanically associated with platen operation so that a fixed increment of ribbon is fed for each stroke of the platen mechanism. When we maintain the printing device D at printing position for two partial impressions, as described above, this would normally require use of a length of ribbon equal to twice the length of the printing area to take a complete impression from the device D. To avoid the extremely high transfer material cost which would result, a method has been devised whereby substantially no more ribbon is used than would be the case if the whole impression were made at one pass of the platen carriage 109. This is accomplished by merely progressing the ribbon by a step equal in amount to about one-half the printing area length at each platen carriage cycle. In this way the impressions are staggered as indicated diagrammatically in FIG. 16 which illustrates a ribbon of transfer material 385 upon which the locations of the impressions of the various lines of type 381–384 are indicated by corresponding line segments, designated 381'–384'. From this it can be seen that the partial impressions will actually not interfere with one another, and that by this method impressions can be made using two passes of the platen carriage for each impression without consuming any more of the carbon ribbon than if the whole impression were made in one pass.

While the forms of the invention shown and described herein are admirably adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention to the forms disclosed herein, for the invention is susceptible of embodiment in other forms and variations. It will be understood, therefore, that the invention is claimed in any of its forms or modifications falling within the spirit and scope of the language employed in the appended claims.

What is claimed is:

1. A printing machine of the character described comprising means for holding a printing device in printing position in a plane; a platen carriage reciprocable adjacent said printing position in a path substantially parallel to the plane of the printing device; a platen supporting means on the carriage; two roller platens rotationally supported by said platen supporting means and arranged to sweep past adjacent non-overlapping portions of the printing device, with their axes extending transversely of the direction of carriage motion and each movable between an extended position relative to said platen supporting means in which its axis is shifted towards the plane of the printing device and a retracted position relative to said platen supporting means in which its axis is more remote from the plane of the printing device than

said extended position; and means for shifting either platen selectively to one or the other of said extended and retracted positions and shifting the other of said platens to the opposite position.

2. A printing machine as set forth in claim 1 which also includes means for shifting said platen supporting means bodily between an extended printing position relative to said carriage in which the extended one of said platens cooperates with said printing device, and a retracted position relative to said carriage preventing cooperation of either platen with said printing device.

3. A printing machine as set forth in claim 1 in which said shifting means includes a shaft; means for mounting said shaft for rotation about its axis; and separate bearing portions on said shaft, one for each of said platens, with their axes offset from the shaft axis in different directions.

4. A printing machine as set forth in claim 1 which also includes means for operating said shifting means to shift said platens alternately into extended position in response to the reciprocatory movements of said platen carriage.

5. A printing machine as set forth in claim 3 which also includes means for rocking said shaft to shift said platens alternately into extended position in response to the reciprocatory movements of said platen carriage.

6. A printing machine as set forth in claim 5 in which the means for rocking the shaft includes a gear on the platen shaft and a rack segment positioned for engagement by the gear during platen carriage travel.

7. A printing machine as set forth in claim 6, which further includes means for moving the rack out of the path of the gear to disable the gear and segment shifting operation at will.

8. A printing machine of the character described comprising means to hold a printing device at a printing position in a plane with the lines of characters thereon oriented in a predetermined direction; power drive means comprising a primary drive element oscillatable in a path generally transverse to said predetermined direction; a platen carriage shiftable parallel to said predetermined direction; means including a bell crank for connecting said primary drive element and said carriage, and imparting movement from the former to the latter; a platen shaft rotatable on the carriage extending transversely of the direction of carriage motion and having a pair of bearing portions with their axes offset from the shaft axis in different directions; two roller platens supported on said shaft, one on each of said bearing portions; means for shifting said shaft bodily between an extending position adjacent the plane of the printing device and a retracted position remote therefrom; two racks one corresponding to each of said platens extending along the direction of carriage motion; and individual means for rotating each platen in response to carriage motion, each of said means including a gear engaged with the corresponding rack.

9. In a printing machine, a frame; a platen carriage shiftable along the frame; a toggle mechanism supported at one end on the carriage; a platen shaft supported by the other end of the toggle mechanism and subject to raising and lowering movements in response to folding and straightening of the toggle mechanism respectively; a roller platen carried on said shaft; cam means associated with the frame and coacting with means carried by the toggle mechanism for partially straightening the toggle mechanism in response to motion of said carriage in one direction; abutment means on the frame and toggle mechanism for completing straightening of the toggle mechanism as the carriage motion in said one direction is completed; detent means on the carriage and toggle mechanism for maintaining said toggle mechanism in straightened condition during carriage travel in the other direction; and abutment means on said frame and toggle mechanism operative at completion of carriage travel in said other direction for overcoming said detent and breaking said toggle mechanism to permit folding thereof and raising of said platen.

10. A printing machine of the character described comprising means to hold a printing device having lines of printing characters thereon at a printing point with the lines of characters oriented in a predetermined direction; power drive means including a primary drive element oscillatable in a path generally transverse to said predetermined direction and substantially parallel to the printing surface of the printing device; a roller platen; a platen carriage supporting said platen and shiftable parallel to said predetermined direction, and means including two levers for connecting said primary drive element and said carriage and imparting movement from the former to the latter, said levers being relatively swingable about a common pivotal axis; means for normally interconnecting the levers for conjoint movement while permitting a change in their angular relationship under overload conditions comprising detent means on one lever normally urged into a recess on a hub of the other lever; blocking means movably associated with said other lever; and means urging said blocking means towards a position blocking access to said recess to prevent reengagement of the detent in the recess whenever it leaves the same until the blocking means is reset.

11. A printing machine of the character described comprising means for holding a printing device in printing position in a plane; a reciprocable platen carriage; a platen supporting means on the carriage; two roller platens rotationally supported by said platen supporting means in end-to-end relation with their axes transverse to the direction of carriage reciprocation; two racks, one corresponding to each of said platens extending along the direction of carriage motion and relative to which the carriage is movable; individual means for rotating each platen in response to carriage travel, each said means including a gear drivingly associated with the related platen and meshing with the corresponding rack; and means for bodily shifting each of said platens relative to the platen supporting means into an extended position closer to the plane of the printing member and for simultaneously bodily moving the other platen relative to the supporting means to a retracted position more remote from the plane of the printing member.

12. In making an operative printed reproduction from an embossed printing device, wherein the device contains a plurality of closely spaced rows of impression characters in side-by-side relation, one row of which contains a series of machine recognization characters requiring a high order of impression uniformity to provide operative response, the method comprising the steps of:

providing support means for holding an embossed printing device and a form to be imprinted in superposed relationship;

providing a platen holder and a guide means for establishing a path of relative movement of said support means and platen holder in afixed spaced relationship;

providing a first platen roller carried by said platen holder dimensioned and aligned to roll along only said one row of characters, and a second platen roller dimensioned and aligned to roll along other than said one row of characters;

on one occasion, placing said first platen roller a fixed distance from said platen holder such that it will roll along said one row in printing contact and said second platen roller to a non-contact position, and with the platens thus positioned, driving said support means and platen holder relative to one another along said path; said,

on another occasion, placing said second platen such that it will roll along other than said one row of characters in printing contact and said first platen

roller in a non-contact position, and, with the platens thus positioned, driving said support means and platen holder relative to one another along said path.

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